

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 October 2001 (25.10.2001)

PCT

(10) International Publication Number
WO 01/79952 A1

(51) International Patent Classification⁷: **G05D 23/19** (74) Agent: VAN BREDA, Jacques; Octrooibureau Los en Stigter B.V., Weteringschans 96, NL-1017 XS Amsterdam (NL).

(21) International Application Number: PCT/NL01/00257

(22) International Filing Date: 28 March 2001 (28.03.2001)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:
1014792 30 March 2000 (30.03.2000) NL

(71) Applicant (for all designated States except US): TECHNISCHE UNIVERSITEIT DELFT [NL/NL]; Julianalaan 134, NL-2628 BJ, Delft (NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, IIU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

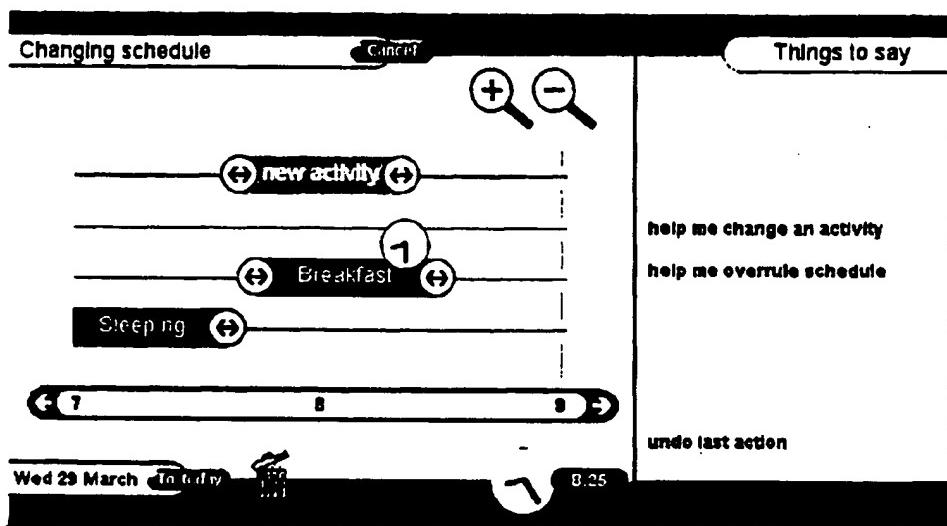
(75) Inventors/Applicants (for US only): KEYSON, David, Victor [NL/NL]; Amstelveen (NL). FREUDENTHAL, Adinda [NL/NL]; Rotterdam (NL). DE HOOGH, Marcus, Petrus, Andreas, Josef [NL/NL]; Delfgauw (NL). DEKOVEN, Elyon, Avram, Micah [NL/NL]; Amstelveen (NL).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: INTERFACE UNIT



(57) Abstract: The invention relates to an interface unit comprising at least a display unit for communication with a user, which is designed for being coupled with a control unit for at least one or more parameters in a living or working environment, such as the temperature setting in a house, which control unit comprises a processor for receiving and processing data inputs and transmitting data outputs. The interface unit is designed for selecting for each room separately a desired temperature setting.

WO 01/79952 A1

Best Available Copy

Interface unit

The invention relates to an interface unit comprising at least a display unit for communication with a user, which is designed for being coupled with a control unit for at least one or more parameters in a living or working environment, such as the temperature setting in a house, which control unit comprises a processor for receiving and processing data inputs and transmitting data outputs.

Such an interface unit is known, for example, in 10 the form of the thermostatic device brought on the market by Honeywell, and by means of which the desired temperature range in a principal living space can be defined in a 24-hour pattern. By means of this it is possible to differentiate between the temperature range during the week 15 and in the weekend.

Such an interface unit, which is designed for selecting for each room separately a desired temperature setting, is known from WO 97/39392.

It is the object of the invention to optimize the 20 known interface unit with respect to use and application possibilities such that the same is simpler to operate and provides more application possibilities.

To this end the interface unit in a first aspect of the invention is characterized in that the temperature 25 setting desired for each room is coupled with, and depends on an adjustable pattern of the user's activities. This makes it possible to realize a complex adjusting system comprising multi-adjustable parameters for each separate room, and being in addition dependent on the moment of the 30 day that is defined by the activity relevant to that moment. In this way it is possible to save energy as well as to realize optimal living comfort. This will be referred to later.

In order to realize the function just mentioned, the display unit in a first display preferably gives an outline of the possible selectable rooms, the desired and the actual temperature for at least one selected room, and 5 a first adjusting member for adjusting the desired temperature in the selected room. In this way the various parameters relating to the temperatures in the various rooms of the house are grouped appropriately and clearly, which makes operation especially simple. The latter holds true 10 in particular if the adjusting member is shown on a touch screen, making it immediately operable.

It is further desirable that in a second display the display unit gives an outline of the activities set for a pre-selectable part of a day, and that it shows a 15 second adjusting member or members for setting, or adding to, or changing said activities. This also furthers the user-friendly operability aimed at with the interface unit according to the invention.

This operation may be further optimized in the 20 embodiment that is characterized in that the selection of an activity in the second display causes the first display pertaining to that selected activity to be retrieved in order to allow the adjustment of the desired temperatures.

As already mentioned above, it is preferred for 25 the interface unit to offer various options to be chosen from the group comprising at least: energy saving, comfort optimization.

In a third aspect of the invention the interface unit is characterized in that, based on a selected option 30 and subject to an observed pattern of activity of the user, the interface unit shows suggestions on the display unit for the adjustment of the settings or the activities, respectively. In this way a totally new method of influencing the living or working environment is created, in 35 which the optimization of comfort or the energy consumption, respectively, can take place in an intelligent deliberation between the user and the interface unit according to the invention. In this way the user retains the

possibility of making a specific adjustment to the various settings, so that the feeling of being master in his own living or working environment is not attacked. A simple way of operating is effectuated especially if the deliberation between system and user takes place via speech. In a first preferred embodiment it is therefore desirable for the image displayed on the display unit to show which verbal instructions are currently available. In a second preferred embodiment, the interface unit itself (also) audibly reproduces the verbal instructions currently available.

In yet another aspect of the invention, the interface unit is characterized in that the same is designed to register the desired settings for each user separately, and in the event of conflicting settings from different users, to show them on the display unit to allow selection of the desired settings.

Although in the foregoing the invention is presented as an interface unit for controlling the temperature settings in a living or working environment, the application of the interface unit is not limited thereto, but may equally effectively be implemented for the control of other types of devices, such as the control of the lighting and/or alarm system. One thing and another may of course also be integrated in a single system.

Although the foregoing description provides the person skilled in the art with an explanation of the invention that is explicit and complete enough for him to reproduce it, one exemplary embodiment will be discussed below for further elucidation. This exemplary embodiment is to be understood not to limit the protective scope of the appended claims.

To aid the discussion of this exemplary embodiment a drawing is enclosed, comprising the figures 1 to 4.

Figure 1 shows the interface's first display by a display unit relating to a main menu.

Figure 2 shows a second display that may be shown on the display unit and which relates to a personal activity schedule of a user.

Figure 3 shows a first display that is presented 5 after selection of an activity shown in accordance with figure 2.

Figure 4 shows a display shown on the display unit for the changing or addition of activities of a user.

As a rule the temperature of the different rooms 10 in a house can be selected within predetermined limits. To this end the user is able to change the respective settings. Figure 1, shows an exemplary main menu, in which on the left, the room options are mentioned; the actually selected room is printed in a rectangle. In the middle of 15 the display the desired and actual temperature pertaining to the selected room is shown, together with the adjusting member in the form of an arrow pointing up and down with which the temperature setting can be changed. On the right of the display, various options are shown that a user may 20 select, such as saving energy and optimizing comfort. In this display it is also possible to adjust the activity schedule via the interface unit.

Figure 2, shows the appropriate activity schedule of an individual user. These activities are presented on 25 different bars, the starting point and end of each activity being controllable by means of operating icons, which are in themselves obvious. At the top right, slightly off centre in the display, two magnifying glasses are shown which are symbolic for the possibility of showing the entire activity schedule (by enlarging the times scale) or 30 of showing only a part of the activity schedule (by reducing the time scale). In this second display, the bar showing the icon "new activity" is always displayed in order to continuously provide the possibility of adding activities. 35

Figure 3 shows the first display that appears when the activity represented in figure 2 by the icon "breakfast" is selected. In the present example the layout

of all floors of the respective house can be displayed. In the present case the ground floor is selected. At the same time the temperature settings and the actual temperature of the various rooms are shown wherein the user whose activity has been selected, can adjust the respective settings.

Figure 4 finally, shows an example of a display that can be used in order to make it possible to define new activities, to change activities or to add activities.

When the option saving energy or optimizing comfort is selected as shown in figure 1, other functions become available. For example, by selecting the option saving energy, the interface unit is able to suggest changes in the activity schedule, based on an actually observed activity pattern, or on the presence of the user. To implement these suggestions, authorization or confirmation by the respective user is always required. The interface unit according to the invention provides the additional possibility to, by means of one single instruction, postpone the entire activity schedule relating to a particular day and relating to a particular user, for a predetermined time.

In the example shown, the input of instructions takes place by means of speech. In the figures 1 to 4, at the right, the possible relevant instructions that may be "understood" by the interface unit are shown on the display unit (see the part "Things to say". These possible instructions are at the same time adjusted to the possibilities of that moment, pertaining to the display shown, and may preferably also be audibly reproduced by the interface unit.

If different users operate, and are authorized to operate the interface unit, the interface unit is preferably embodied such that the settings are registered separately for each user, and that in the event of conflicting settings, the display unit shows the conflicting settings on the display unit in order to allow the users to conclusively determine the desired settings.

CLAIMS

1. An interface unit comprising at least a display unit for communication with a user, which is designed for being coupled with a control unit for at least one or more parameters in a living or working environment, such as the temperature setting in rooms of a house, which control unit comprises a processor for receiving and processing data inputs and transmitting data outputs, which interface unit is designed for selecting for each room separately a desired temperature setting, characterized in that the temperature setting desired for each room is coupled with, and depends on an adjustable activities pattern of at least one user.
2. An interface unit according to claim 1, characterized in that the display unit in a first display preferably gives an outline of the possible selectable rooms, the desired and the actual temperature for at least one selected room, and a first adjusting member for adjusting the desired temperature in the selected room.
3. An interface unit according to claim 1 or 2, characterized in that in a second display the display unit gives an outline of the activities set for a pre-selectable part of a day, and that it shows a second adjusting member or members for setting, or adding to, or changing said activities.
4. An interface unit according to claims 2 and 3, characterized in that the selection of an activity in the second display causes the first display pertaining to that selected activity to be retrieved in order to allow the adjustment of the desired temperatures.
5. An interface unit according to one of the preceding claims, characterized in that the interface unit offers various options to be chosen from the group comprising at least: energy saving, comfort optimization.

6. An interface unit according to claim 5, characterized in that based on a selected option and subject to an observed pattern of activity of the user, the interface unit shows suggestions on the display unit for the 5 adjustment of the settings or the activities, respectively.

7. An interface unit according to one of the preceding claims, characterized in that the same is voice-controlled.

10 8. An interface unit according to claim 5, characterized in that the image displayed on the display unit shows which verbal instructions are currently available.

9. An interface unit according to claim 7 or 8, characterized in that the same audibly reproduces the verbal 15 instructions currently available.

10. An interface unit according to one of the claims 1-9, characterized in that the interface unit is designed to register the desired settings for each user separately, and in the event of conflicting settings from 20 different users, to show them on the display unit to allow selection of the desired settings.

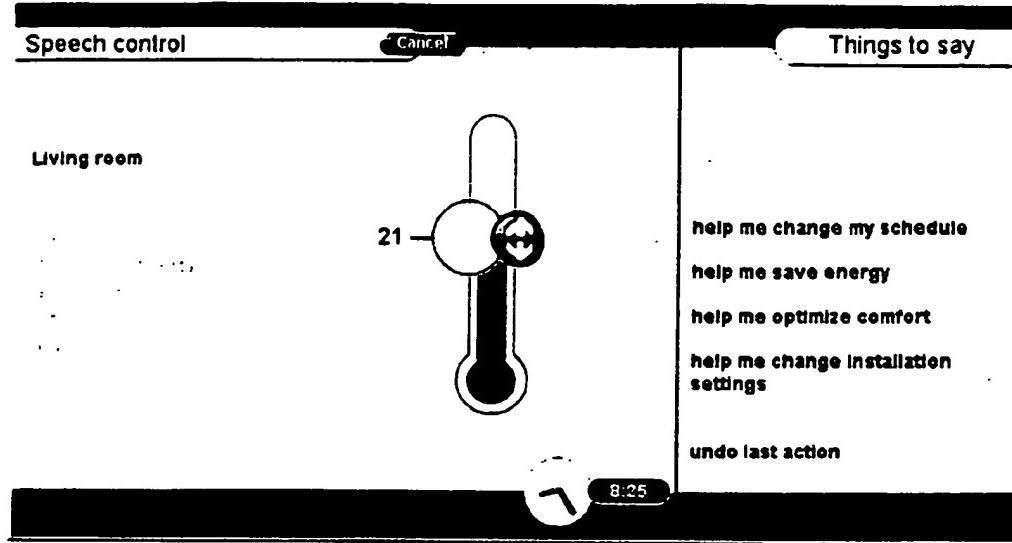


FIG. 1

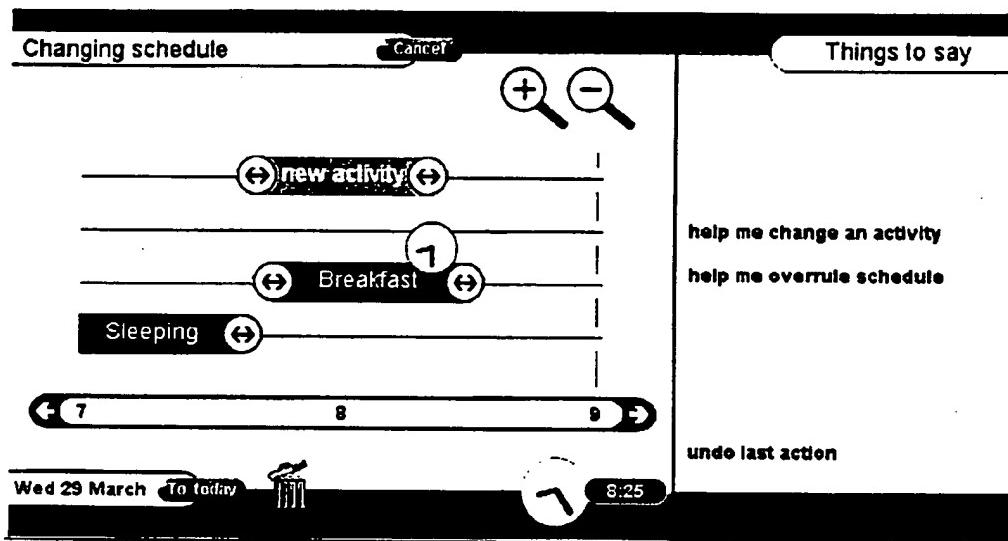


FIG. 2

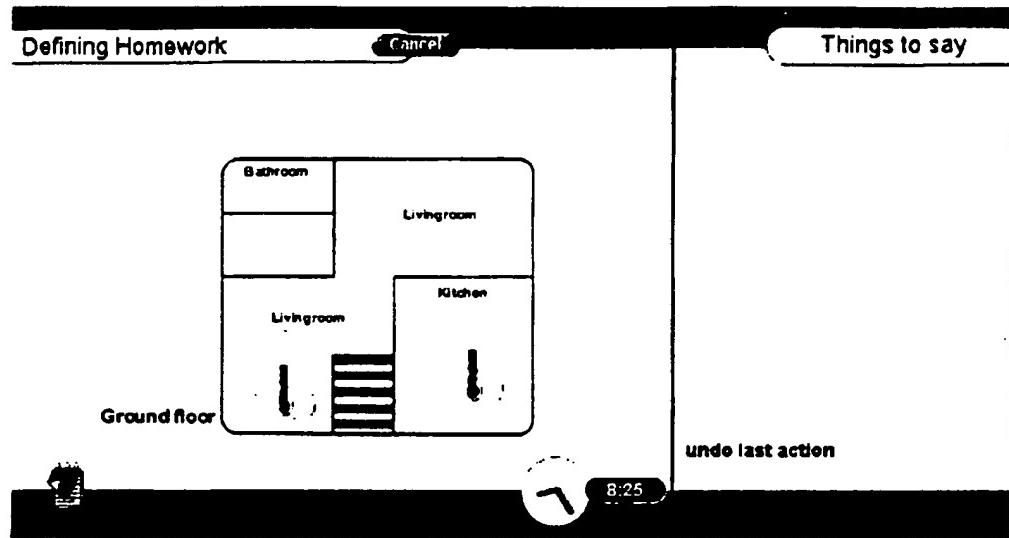


FIG. 3

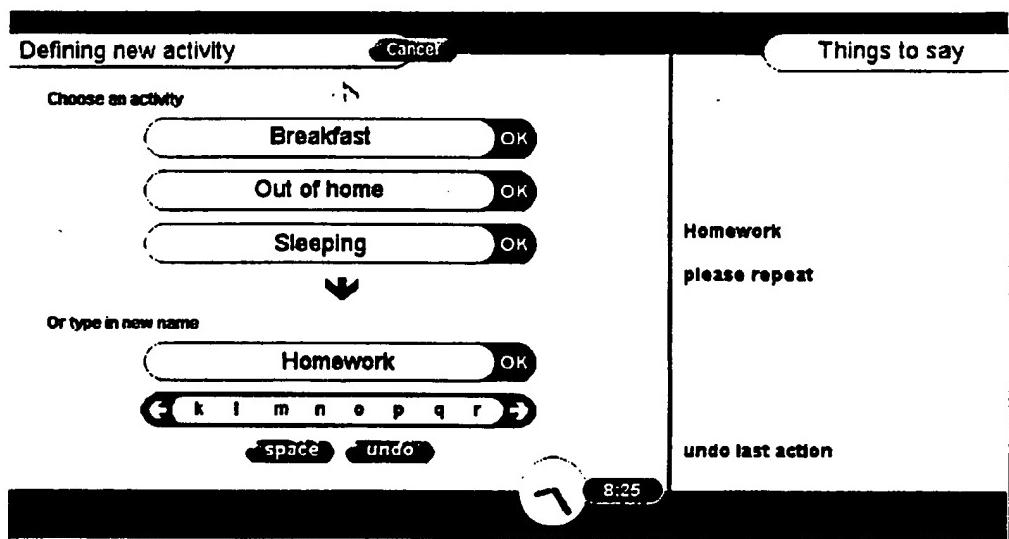


FIG. 4

INTERNATIONAL SEARCH REPORT

National Application No

NL 01/00257

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 605D23/19

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 605D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 39392 A (E. HANAZEDER) 23 October 1997 (1997-10-23) cited in the application page 6, paragraph 2 -page 7, paragraph 1; figure 3 ---	1-3
Y	US 5 449 319 A (DUSHANE ET AL.) 12 September 1995 (1995-09-12) column 11, line 14 -column 12, line 8; figure 12A ---	5,7
X	US 4 516 207 A (M. MORIYAMA ET AL) 7 May 1985 (1985-05-07) abstract; figure 1 ---	1-3
Y	FR 2 762 470 A (F. SCARELLA) 23 October 1998 (1998-10-23) page 2, line 7 - line 21; figure 1 ---	5
Y	US 4 516 207 A (M. MORIYAMA ET AL) 7 May 1985 (1985-05-07) abstract; figure 1 ---	7

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

11 July 2001

19/07/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Goetz, P

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 01/00257

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9739392	A	23-10-1997	AT	404997 B	26-04-1999
			AT	69296 A	15-08-1998
			AU	2498297 A	07-11-1997
			DE	19780316 D	01-04-1999
			EP	0894297 A	03-02-1999
US 5449319	A	12-09-1995	US	5348078 A	20-09-1994
			AU	7325294 A	06-02-1995
			WO	9502156 A	19-01-1995
			US	6213404 B	10-04-2001
FR 2762470	A	23-10-1998	NONE		
US 4516207	A	07-05-1985	JP	1439924 C	19-05-1988
			JP	57147912 A	13-09-1982
			JP	62030933 B	06-07-1987
			CA	1187993 A	28-05-1985
			DE	3208257 A	30-09-1982
			GB	2094509 A, B	15-09-1982

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 October 2001 (25.10.2001)

PCT

(10) International Publication Number
WO 01/79952 A1

(51) International Patent Classification⁷: **G05D 23/19**

(21) International Application Number: **PCT/NL01/00257**

(22) International Filing Date: 28 March 2001 (28.03.2001)

(25) Filing Language: **Dutch**

(26) Publication Language: **English**

(30) Priority Data:
1014792 30 March 2000 (30.03.2000) NL

(71) Applicant (*for all designated States except US*): TECHNISCHE UNIVERSITEIT DELFT [NL/NL]; Julianalaan 134, NL-2628 BL Delft (NL).

Petrus, Andreas, Josef [NL/NL]: Zuidpoldersingel 43, NL-2645 JK Delfgauw (NL). DEKOVEN, Elyon, Avram, Micah [NL/NL]: Kathleen Ferrierlaan 40, NL-1183 CB Amstelveen (NL).

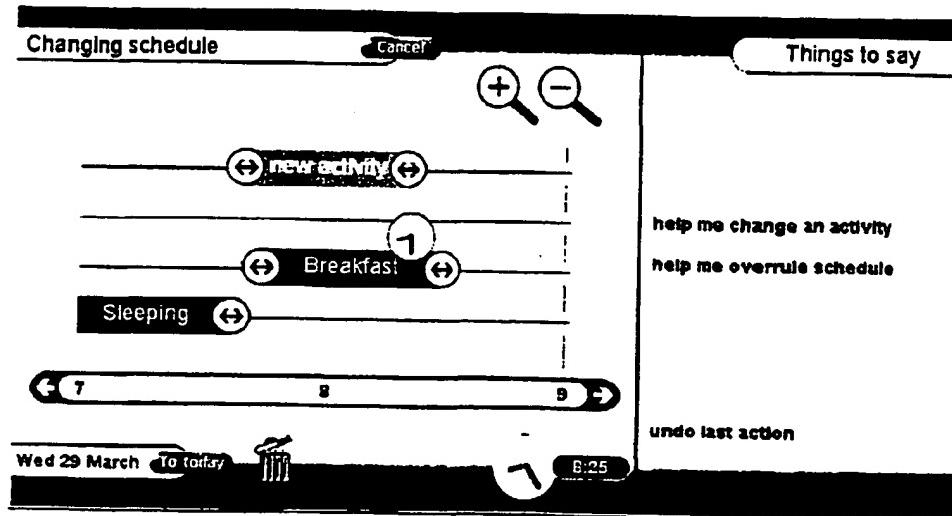
(74) Agent: VAN BREDA, Jacques: Octroobureau Los en Stigter B.V., Weteringschans 96, NL-1017 XS Amsterdam (NL).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: INTERFACE UNIT



WO 01/79952 A1

(57) Abstract: The invention relates to an interface unit comprising at least a display unit for communication with a user, which is designed for being coupled with a control unit for at least one or more parameters in a living or working environment, such as the temperature setting in a house, which control unit comprises a processor for receiving and processing data inputs and transmitting data outputs. The interface unit is designed for selecting for each room separately a desired temperature setting.



Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(48) Date of publication of this corrected version:

3 January 2002

(15) Information about Correction:

see PCT Gazette No. 01/2002 of 3 January 2002, Section
II

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.